Chp 10-Review Questions. Observing Properties of Distant Stars

1.      Explain the difference between a star's apparent brightness and its luminosity.
2.      Why does it take at least six months to make a measurement of a star's parallax?
3.      What is the inverse-square law? Use it to explain why an ordinary lightbulb can appear brighter than a star, even though the lightbulb emits far less light energy per second.
4.      Why is the magnitude scale called a "backward" scale? What is the difference between apparent magnitude and absolute magnitude?
5.      The star Zubenelgenubi (from the Arabic for "scorpion's southern claw") has apparent magnitude 2.75, while the star Sulafat (Arabic for "tortoise") has apparent magnitude 3.25. Which star appears brighter? From this information alone, what can you conclude about the luminosities of these stars? Explain your answer.
6.      Menkalinan (Arabic for "shoulder of the rein-holder") is an A2 star in the constellation Auriga (the Charioteer). What is its spectral class? What is its spectral type? Which gives a more precise description of the spectrum of Menkalinan?
7.      If a red star and a blue star both have the same radius and both are the same distance from Earth, which one looks brighter in the night sky? Explain why.
8.      If a red star and a blue star both appear equally bright and both are the same distance from Earth, which one has the larger radius? Explain why.
9.      Sketch a Hertzsprung-Russell diagram. Indicate the regions on your diagram occupied by (a) main-sequence stars, (b) red giants, (c)supergiants, (d) white dwarfs, and (e) Sun.
10.     What information about stars do astronomers learn from binary systems that cannot be learned in any other way? What measurements do they make of binary systems to garner this information?
11.     Which is more massive, a red main-sequence star or a blue main- sequence star? Which has the greater radius? Explain your answers.

Chp 10-Discussion Questions. Observing Properties of Distant Stars

1.      In its orbit around Earth, the *Hipparcos* satellite could measure stellar parallax angles with acceptable accuracy only if the angles were larger than about 0.002 arcsec. Discuss the advantages or disadvantages of making parallax measurements from a satellite in a large solar orbit, say at the distance of Jupiter from the Sun. If this satellite can also measure parallax angles of 0.002 arcsec, what is the distance of the most remote stars that can be accurately determined? How much bigger a volume of space would be covered compared to Earth-based observations? How many more stars would you expect to be contained in that volume?
2.      As seen from the starship *Enterprise* in the *Star Trek* television series and movies, stars appear to move across the sky due to the starship's motion. How fast would the *Enterprise* have to move in order for a star 1 pc away to appear to move 1° per second?
(*Hint: The speed of the star as seen from the Enterprise is the same as the speed of the Enterprise relative to the star.*) How does this compare with the speed of light? Do you think the stars appear to move as seen from an orbiting space shuttle, which moves at about 8 km/s?

Chp 10-Collaborative Group Exercises. Observing Properties of Distant Stars

1.      Considering where your group is sitting right now, how many times dimmer would an imaginary, super-deluxe, ultrabright flashlight be if it were located at the front door of the group member who lives farthest away as compared to if it were at the front door of the group member who lives closest. Explain your reasoning.

2.	As a group, select any two of the stars in a text appendix listing of the sky's brightest stars and compare the apparent visual magnitudes to determine how many times brighter one is than the other.